General Notes.

GENERAL BIOLOGY.

The average Contribution of each several Ancestor to the total Heritage of the Offspring.[1]—We inherit not only from our parents but also from our grandparents to remote generations. The problem is: What proportion of the whole is, on the average, inherited from each generation?

In an earlier work, Galton, as a result of experiments on sweet peas, reached the conclusion that 50 per cent. of our qualities are on the average derived from our two parents, and he suggested the probability that 25 per cent. comes from our four grandparents, 12.5 per cent. from all our great-grand-parents, and so on, the sum being 100 per cent. thus accounting for the whole inheritance. The present paper brings the required proof of Galton's hypothesis.

The method of proof is noteworthy. Galton had access to pedigree records of 'Basset' hounds bred through twenty years. These exhibited only two color types—tricolor (T) and non-tricolor (N). There were 817 hounds of known color derived from parents of known color: 567 of these had all four grandparents of known color; and 188, all great-parents. Galton determined, for example, whether the proportion of T-progeny of a known ancestry corresponds to the law of contribution enunciated above. He separated the progeny into three lots; namely, those which have 2 T-parents, 1 T-parent or 0 T-parent; each of these may be subdivided into lots having 4, 3, 2, or 1 T-grandparent. Do the percentages of T-progeny in these lots accord with what we might calculate from the law? Let us take a case; there are 119 individuals which have 2 T-parents and 3 T-grandparents. What per cent. should be tricolor? The two T-parents should each determine 25 per cent. total, 50 per cent. Each of the 3 T-grandparents should determine $\frac{1}{4} \times 25$ per cent., 6.25 per cent., total 18.75 per cent. together 68.75 per cent. To this must be added the influence of the T-great-grandparents and earlier ancestors. The probable percentage of unobserved T-ancestors and hence of T-generating influence may be calculated on the assumption that the percentage of T-parents producing T or N progeny will be the same for unknown as for known generations. By an exten-

[1] Francis Galton: Proc. Royal Soc. lxi, p. 401–413, 1897.

sive calculation, not necessary to reproduce here, Galton found that the totality of the ancestors of each T-grandparent determines the tricolor character of 4 per cent. of the progeny, and all the ancestors of each N-grandparent determines the T-characters of 2 per cent. of the progeny, so we must add to our sum 3×4 per cent.$=12$ per cent. for the 3 T-grandparents and 2 per cent. for the N-grandparent which gives the grand total of $68.7+12+2=83$ per cent. of the 119 progeny (or 99 individuals) which should be tricolor. As a matter of fact of the 119 individuals which had the ancestry in question 101 individuals were tricolor. Many comparisons between calculations and observations were made which agreed as well as this and thus confirmed the truth of the conclusion that we inherit on the average one-half of our qualities from our parents and half the remainder from each successive earlier generation of ancestors.—C. B. D.

Preformation vs. Epigenesis.—That the modern revival of the preformation—epigenesis controversy is resulting in a harmonious middle position through the application of the experimental method is a source of gratification as well to the believers in the application of this method to embryology as to those who desire the settlement of the dispute. Incidentally, however, these experiments are giving a clearer insight into the form-producing and form-maintaining factors. One of the latest contributions of this sort is that of Crampton who has described in the Annals of the New York Academy of Sciences, Volume X, experiments on isolated blastomeres of the Ascidian *Molgula manhattensis*. He finds that here, much as in the sea-urchin, the one-half blastomere undergoes a strictly partial cleavage, but rearrangements of blastomeres soon occur which tend to mask the partial nature of the development. Eventually a nearly complete larva of less than normal size and with defects in certain organs is produced. The missing half has been supplied by the cells already present. Thus there is here no pure epigenesis, no strict preformation, but a remarkable regulation phenomenon, as Driesch would say, by which the mutilated organism attempts, but not altogether successfully, to develop normally despite the unfavorable conditions.

Dissemination of organisms.—Experiments of Dr. Amedeo Berlese showing how insects and especially ants and some species of flies aid in the diffusion, preservation, and multiplication of yeasts, are described in a recent number of *Nature*.[2]

[2] Nature, Oct. 14, 1897, pp. 575–577.

It is shown that yeasts not only may be carried in the digestive tract of flies (as well as upon the external parts of the body) but that they actually multiply there. The belief is expressed that many yeasts ordinarily pass the winter within the digestive tracts of insects, rather than upon the surfaces of plants or in the soil.

A Plankton Note.—Another illustration of the abundance of certain small animals in the ocean is furnished in a letter from W. A. Herdman published in *Nature*.[3] While crossing the Labrador current at about long. 50° W. in the steamship Parisian the party were served with a copepod stew. The little crustacea were caught by pumping the water into the ship and straining it through silk nets. In this way it was easy to obtain a sufficient number to make a "respectable dish."

MINERALOGY.

New Minerals. Derbylite.—Hussak and Prior[1] give a full description of a new antimono-titanate of iron, of which they had given a preliminary notice.[2] The mineral, named Derbylite in honor of the distinguished geologist of Brazil, O. A. Derby, occurs in the cinnabar-bearing sands of Tripuhay, Minas Geræs, Brazil, and has also been found in place in certain muscovite schists in the near vicinity. Derbylite is orthorhombic, $\breve{a} : \bar{b} : c = 0.96612 : 1 : 0.55025$. Twins on 011. Fracture parallel to 001 but no good cleavage. Crystals minute, color pitch-black, lustre resinous, hardness about 5, specific gravity 4.530. Optical properties undeterminable on account of opacity. Composition probably $FeO, Sb_2O_5 + 5\ FeO, TiO_2$ neglecting small amounts of silica, alumina and alkalies.

Zirkelite.—Prior[3] gives a revised analysis of this new mineral[4]

ZrO_2	TiO_2	ThO_2	Ce_2O_3	$(Y_2O_3?)$	UO_2	FeO	CaO	MgO	Ignition	Sum
52.89	14.95	7.31	2.52	0.21	1.40	7.72	10.79	0.22	1.02	99.03

corresponding to the formula (approximately) RO.2 (Zr Ti Th) O_2.

[3] Nature, Vol. 59, p. 565, Oct. 14, 1897.

[1] Min. Mag., Vol. XI, No. 52, p. 176.

[2] Min. Mag., Vol. XI, No. 50, p. 85.

[3] Min. Mag., Vol. XI, No 52, p. 180.

[4] First described in Min. Mag., Vol. XI, No. 50, p. 88. See abstract this journal, Vol. XXXI, July, 1897, p. 601.